

SHARK ATTACKS IN WESTERN AUSTRALIA

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As far as I am aware, there have been about a dozen possible shark attacks in Western Australia, though doubt has been cast on a couple of them. As long ago as 1803 a French sailor was mortally bitten in Sharks Bay, as recently as May 1949 a young lady was attacked at Broome, and in 1950 a man's hand was found in a shark. It is necessary to tabulate and study these unfortunate cases in hopes of finding, if possible, some reason for them with a view to preventing further occurrences. Here, then, is a list of all the Western Australian records known to me. If anyone has data on others I should be grateful to learn of them.

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Date	Person	Particulars	Authority
1803—March M. Lefevre		Faure I., Sharks Bay.	Peron, <i>Voyage de Decouvertes aux Terres Australes</i> , vol. 2, 1816, p. 226.
1876— Aboriginal pearl diver		Between De Grey River and Port Walcott. Severely bitten. Recovered.	Pemberton Walcott, <i>Rept. Master Revenue Vessel</i> (Govt. Printer, Perth), 1876, p. 4. <i>vide</i> D. L. Servery.
?Year— Ted, a diver		South of Dampier Archipelago.	N. W. Caldwell, <i>Fangs of the Sea</i> , 1936, p. 257.
1923— Boy, Charles Robinson		Claremont, Swan R. Died.	Coppleson, <i>Med. Journ. Austr.</i> , April 15, 1933, pp. 449-457; <i>case</i> W.1.
1923—Nov. 23 (?shark attack)		Condon, N.W. Australia.	Whitley, <i>Fishes of Australia</i> , vol. 1, 1940, p. 260.
1924—April 30 (doubtful attack)		Fremantle.	Coppleson, <i>ms.</i>
1925—June Human arm found in shark		Princess Royal Harbour, King George's Sound.	Coppleson, <i>l.c.</i>
1925—Nov. 22 Samuel Ettelson		Cottesloe. Killed.	<i>Daily News</i> (Perth), Nov. 26, 1925. Coppleson's <i>case</i> W.2.
1946—Feb. 10 R. D. Sunderland		City Beach. Attacked 3 times within 40 ft. of shore by Blue Whaler. Recovered. Surfboat also attacked.	Perth newspapers.

Date	Person	Particulars	Authority
1949—Jan. 5	Hand found inside Tiger Shark	North Fremantle.	Perth newspapers.
1949—May 16	Miss K. Passaris	Broome. Left arm taken. Recovered.	Perth newspapers.
1950—March 5	Man's hand found inside 4½ ft. shark	Safety Bay.	<i>Sydney Morning Herald</i> , March 11, 1950.

Western Australians may congratulate themselves that there are fewer shark attacks and apparently fewer man-eating sharks in the west than there are in Queensland and New South Wales, but a recent shark attack must give cause for some concern as to whether everything is being done to keep up the enviable record so far held. If offal, blood or waste from meatworks, slaughterhouses, or whaling stations or even fishing boats be allowed to pass into the sea then sharks are likely to be attracted from miles around and may attack anyone bathing in the vicinity. It should not be necessary for Government regulations or official action to prevent such fouling of the water; the natural commonsense of all citizens concerned should prevail and the rubbish be disposed of ashore.

THE RECENT ATTACK AT BROOME

According to the newspapers, on Monday, May 16, 1949, while a woman friend tried to rescue her, Miss K. M. Passaris (22) was attacked by a shark at Broome, when she was swimming only 10 yards from the shore in 5 feet of water. Her left arm was torn off above the elbow, but she recovered. The shark itself was caught on the late afternoon of May 21, five days afterwards, and the whole forearm found inside it.

It is most important to identify the species of sharks responsible for fatalities, but this is rarely possible because even if the shark be caught it is generally butchered and destroyed and the many exact details which a specialist requires to determine the species are not forthcoming. Generally the shark is loosely referred to as a "Grey Nurse" or "Blue Shark," Whaler or Tiger without proof of identity being given.

A photograph and six teeth from the shark which attacked Miss Passaris have been sent to me for identification through the good offices of Mr. A. O. Ferguson, Pearling Inspector at Broome, to whom they were kindly lent for this purpose by several persons who owned these souvenirs. The photograph is not suitable for reproduction and shows practically no characters by which the

shark can be identified. The teeth, however, are those of a Whaler of the genus *Galeolamna*, of which eight species or subspecies are known from Western Australia. The six teeth (Fig. 1) are somewhat chipped and at least four of them appear to have come from the upper jaw; however, the number of teeth in either jaw (an important character) was not ascertained. The teeth are roughly in the shape of a triangle in which each side has been pushed in, the root of each tooth is of course strongly concave or "fish-tailed" in outline and each side of the triangular tooth is concave or excavate. Serrations extend along shoulders and cusps of teeth. The heights of the teeth, which are not strongly deflected, would have been from about 15 to 25 mm. but cannot be stated accurately as tips have been broken; the maximum basal widths are 16.5, 22, 25, 27, 28 and 28 mm. Mr. Ferguson later sent



Fig. 1.—Six teeth from the Whaler Shark concerned in the Broome attack.

Photo Howard Hughes

photos of similar sharks caught at a later date at Broome. However, details of dental formulae, presence or absence of interdorsal ridge, etc., etc. were lacking and so no progress in identification could be made. Mr. A. O. Ferguson supplied the length and estimated the weight (the shark was not weighed) and a number of teeth, without roots, were presented to The Australian Museum by Dr. D. L. Serventy (Regd. no. IB.2420). Other measurements had been jotted down by Mr. B. S. Bardwell. From all this material, I have drawn up the following brief description of the actual Broome shark which attacked Miss Passaris:—

Snout broadly rounded. Teeth as described and figured above. Five gill-slits, very close together. Dorsal fins large, the first not so high as in *Galeolamna dorsalis*, but measuring $14\frac{1}{2}$ inches high and $13\frac{1}{2}$ in. along base (to tip). Pectoral fin $21\frac{1}{2}$ in. long by 14 in. across. Ventral fin 5 by 5 by 9 in. Caudal fin 27 in. long and 15 in. from near upper caudal origin to tip of lower lobe; distal region of upper caudal lobe $2\frac{1}{2}$ in. Bluish-grey above, whitish below; some fins with dusky tips. Length 9 ft. 3 in. Estimated weight 350 to 400 lbs.

It is upon photographs, jaws and notes of sharks caught later in the Broome district, and regarded as identical by local persons with the shark which attacked Miss Passaris, that we must rely for further data. Mr. Ferguson sent photos of an $8\frac{1}{2}$ ft. shark which shows the heavy build and large second dorsal fin, but fuller particulars are forthcoming as a result of a cruise in the area of the Fisheries Research vessel *Warreen* when a conspecific shark was caught on a handline by Mr. W. Bowers on September 16, 1949 in Roebuck Bay. Mr. Bruce Shipway compared it with a White Shark (*Carcharodon*) and reported as follows:—

"During the evening W. Bowers caught a Carcharid shark, 280 cms. in total length. Female containing no embryos. Similar to *Carcharodon albigors* [in my *Fishes of Australia*, 1940, p. 126—G.P.W.] but lacking the caudal keel and with [more posterior] gill-slits, the centre one being over the origin of the pectoral fin, about 2-3 the length of *C. albigors*. Posterior slit the shortest. No spiracle. Remainder as for *C. albigors*. When landed on the deck all the fins except the dorsals oozed blood. The jaw was dismantled, dried, and retained by Mr. Bowers. Visitors viewing the jaws later stated they were similar to those removed from the shark that mutilated the girl swimming near the Broome jetty recently. These jaws have been on display at one of the local hotels until recently but their present whereabouts are unknown."

Mr. Shipway took a photograph of the shark, here reproduced (Fig. 2). Notice the short, blunt snout, large anal fin; the second dorsal fin is partly hidden by the body, but is of fair size and originates in advance of the anal origin.

Dr. Serventy later supplied the following notes on the jaws, with a photograph (Fig. 3):

"The jaws of the shark caught on September 16 in Roebuck Bay were re-examined; the dental formula of the upper jaw was 13.2.13 and of the lower jaw 12.2.12. The teeth were serrated on both edges, triangular in shape with a slight concavity on the



Fig. 2.—A shark caught in Rockuck Bay in September, 1949, and regarded as belonging to the same species as that figuring in the Broome attack.

Photo Bruce Shipway



Fig. 3.—Jaws of shark shown in Fig. 2.

outer side. They were of Galeolamnoid type; 6-8 teeth in a row. Lower jaw teeth narrower, serrated on eusp and base. The teeth were compared with a series of teeth obtained from Inspector Ferguson and taken from the shark which attacked Miss Passaris on May 16; they were a perfect match. The crew stated that the shark caught on September 16 was unlike any they had seen previously; it differed in appearance from the sleek whalers we are now catching; it was 'very heavy forward,' of bison-like aspect, all the weight being forward."

Unfortunately, we still have no information as to whether an interdorsal ridge was present or not. However, I have compared all the available data and the teeth with specimens and much unpublished descriptive material at The Australian Museum, especially with very detailed field-notes on specimens examined and dissected personally from north-western Australia, the Northern Territory and Papua. By a process of elimination, and as far as one can be certain from the limited information available concerning the species, I have come to the conclusion that the shark concerned in the Broome attack was a Swan River Whaler, *Galeolamna mckaili*. This shark was described by me as a subspecies of *Galeolamna greyi* (*Austr. Zool.*, vol. 11, 1945, p. 2; based on *Fish. Austr.*, vol. 1, 1940, p. 273, fig. 303). However, two other subspecies of *Galeolamna greyi* occur in the intervening area between Fremantle and Broome—the nominate form *greyi* in the south and *cauta* in Sharks Bay. So if the form *mckaili* reappears in the northern part of the State we should, perhaps, readjust our ideas regarding the taxonomic status of these forms and admit *mckaili* as specifically distinct from *greyi*.

RATE OF DIGESTION

The rate of digestion in sharks may be of some forensic importance. In the notorious "Shark Arm Case," Sydney, 1935, a good deal hinged on the fact that the arm of a man which had been vomited by a Tiger Shark, which had evidently swallowed it a week previously, showed little or no signs of having been digested.*

In the recent attack at Broome the lady's arm had been in the shark five days and was not affected. In March 1950 a hand, believed to have been that of Peter Szot, was found partly decomposed after having evidently been in a Tiger Shark for not more than a week.

It seems then that sharks may suspend the action of the digestive juices at times, though ordinarily these seem to act very rapidly.

*See my *Fishes of Australia*, vol. 1, 1940, p. 34, also Gudger's latest papers on the food of Tiger Sharks: *Austr. Mus. Mag.*, vol. 9, 1948, p. 282; *Journ. Elisha Mitchell Sci. Soc.*, vol. 54, 1948, p. 221; and *Copeia*, 1949, vol. 1, p. 39. Dr. Coppleson has also shown me a ms. English translation of Dobreff's paper on the digestion of sharks which originally appeared in *Arch. ges. Physiol.*, Berlin, ccxvii, 1927, p. 221.

In Sharks Bay I made the following observations on the rate of digestion in Tiger Sharks. On August 20, 1944 at 10 a.m. a Tiger Shark (*Galeocerdo cuvier*) was caught which had digested to the bone a large piece of turtle which might have been eaten the day or night before, yet on September 5, at 7.45 a.m. we caught a Tiger Shark in which were fish which had been thrown overboard the night before, and they were not digested. Similarly with one caught on September 11: it had swallowed a Pied Cormorant shot half an hour before the shark was killed and had eaten tailer and other fish thrown overboard the day before yet no digestion was noticeable.

AUSTRALIAN SHARK ATTACKS

There have been about 270 cases of sharks attacking man, horses, dogs, boats or surf-skis in Australian waters during historical times; about 100 persons have been killed in these 160 years, but many have recovered and some of those injured were bitten only when handling captured sharks. The most dangerous sharks appear to be the Whaler, Tiger, Grey Nurse, Blue Pointer and Hammerhead. Dull or clear weather, time, wind, temperature of air and water, state of tide, locality, presence of school fish, foulness of water and many other factors require consideration in connection with attacks and one cannot have too detailed information in each case. Even so, and after careful study of all the information it is not yet possible to lay down any laws governing the behaviour of man-eating sharks—they are most unsportsmanlike and do not seem to obey any rules! The best prevention is to swim in an enclosure but a shark repellent, normal copper acetate, has been tested in Western Australia and found to be effective (Whitley and Payne, *Australian Zoologist*, vol. 11, June 1947, p. 151).

Dr. V. M. Coppleson recently surveyed the incidence of shark attacks since 1919 in *Med. Journ. Austr.*, Nov. 4, 1950, pp. 680-687, figs. i-vii and there has been subsequent correspondence on the subject in that journal. He considered that "meshing . . . appears to have eliminated or greatly reduced the risk of attack" and that a single dangerous shark may be responsible for several attacks over a period and so it should be hunted and destroyed.

In my *Fishes of Australia*, 1940, I gave an appendix listing all the Australian shark tragedies then known. Several attacks have occurred since and some overlooked older records have come to light, often having been brought to my attention by friends to whom I now express my thanks. May I be permitted to add the following to my 1940 list so as to bring these sad statistics up to date?*

*All wartime cases may not have been recorded. I have eliminated all incidental injuries received in the handling of sharks, etc., which were included in my previous lists, as these are not true attacks on man.

- 1791 ante Feb. Aboriginal. Female. N.S. Wales. Bitten in two. Authority: Tench, *Complete Acc. Settlm. Port Jackson*, 8vo, edition, 1793, p. 107.
- 1839 Nov. 17. Mr. Johnson. N.S.Wales. Drowned Nov. 17, and his head bitten off by a shark on Nov. 19. Attacked after death. *Australasian Chronicle*, Nov. 22, 1839.
- 1876 Aboriginal pearl diver. Between De Grey R. and Port Walcott, W.A. Severely bitten. Recovered. Pemberton Walcott, *Report Master Revenue Vessel* (Govt. Printer, Perth), 1876, p. 4—*vide* Dr. D. L. Serventy.
- c.1876? Boy. Sydney. Side bitten out. Died. *Fide* Mrs. Little, Kogarah, in *lit.* 1941.
- 1880 Jan. Boat attacked. Chowder Bay, Sydney, N.S. Wales. *Sydney Morning Herald*, Jan. 24, 1880.
- c.1880 Albert Burliss. Milson's Point, Sydney, N.S.W. Leg removed. *Fide* F. A. McNeill *ms.*, 1940.
- 1884 Daughter of Capt. Warren fell overboard from the *Bellona* and was taken by a shark near Port Pirie, S. Australia. *Register* (S.A.), Dec. 9, 1925.
- 1887 c.March. Mr. Barfoot, Dobroyd Head, Sydney. Body found in Tiger Shark. He had been lost at Watson's Bay days before in a boat capsize. Other human remains in sharks at Berry's Bay next day. G. W. Wellesley, in *lit.*, 1941.
- 1887 Youth, Cochrane. Ryde, N.S.W. Killed. M.C.I. Levy, *Wallumetta*, 1947, p. 234.
- 1888 Dec. 10. Stephen Carter (11), swimming by the sawmills near Iron Cove Bridge, Sydney, taken and killed by a shark. *Sydney Morning Herald*, Dec. 10, 1888, p. 5.
- 1888 Dec. Mr. Ryland working on Hawkesbury Bridge, N.S.Wales, missed his footing, fell 50 feet into the river where he was attacked and killed by a shark. *Sydney Morning Herald*, Dec. 14, 1888, p. 5.
- 1895 Knut Dahl's oar attacked. Dampier's Creek, Broome, W.A. Dahl, in *Savage Australia*, 1926, p. 267.
- c.1896 Donald. Boy. Leichhardt. Lost a leg. *Fide* Mrs. Little, in *lit.*, 1941.
- 1907 or earlier. Captured shark bit man's toe. Northern Territory. A. Searcy, in *Australian Tropics*, 1907, p. 116.
- 1909 Attack at Woy Woy, N.S.Wales. E. T. Russell, *Lone Hand*, Dec. 1, 1910, p. 134.
- ?Year. Native diver had calf of leg bitten off by 3 ft. shark, Torres Strait area. A. Marshall, *Ourselves Writ Strange*, 1948, p. 112.
- 1935 March 4. Samuel, a South Sea Islander, fell off lugger *Dahlia* off Queensland coast. Shark took mouthful of buttocks. Victim landed at Mackay and recovered. *Fide* G. D. Wall, Mackay, 1946.
- 1940 Man's hand bitten by shark. Kerema, Papua, *Papuan Villager*, Nov. 1940.
- 1940 Dec. M. Garten, soldier. Darwin. Leg lacerated by a shark in fish trap. Recovered.
- 1940 Dec. 26. C. Hammond. Stockton, N.S.W. Died.
- 1942 Jan. 4. Woman, Z. Steadman, Bantry Bay, Middle Harbour, N.S.W. Shallow water. Bitten in half. Died.
- 1942 Jan. 18. Paddle of a surf-ski bitten at Manly, N.S.W.
- 1942 March 4. Arm of Ronald J. Bishop (18) found and identified as having been bitten off by a shark, George's River, N.S.W., where he had been drowned. *Sun* (Sydney), March 27, 1942.

- 1942 Sept. 12. Man, A. Wearne. Cairns, Queensland. Foot and part of leg taken, in 8 ft. of water. Recovered. *Sydney Morning Herald*, Aug. 11, 1943.
- 1942 Dec. 26. Girl, D. R. Burch (16). Bantry Bay, Middle Harbour, N.S.W. Bitten on left thigh in shallow water. Died.
- 1943, ante Mareh. Girl killed in Queensland.
- 1944 Jan. 17. Boy, P. Weir (14). Forster, N.S.W. Legs bitten. Recovered. *Daily Mirror* (Sydney), Jan. 18, 1944.
- 1944 Oct. Dinghy attacked. Tewantin, Queensland.
- 1945 June 18. Young Australian serviceman. Double Id., near Cairns, Queensland. Few yards from shore. Died.
- 1946 Jan. 5. Girl, V. G. Tegel (14). Oatley, George's River, N.S.W. In 3 ft. of water. Died.
- 1946 Jan. 17. Boy, Donald Vaughan (12). Townsville, Queensland. Recovered.
- 1946 Feb. 10. Man, R. D. Sunderland (18). City Beach, Perth, W.A. Attacked 3 times within 30 ft. of shore. Surfboat also attacked. Man recovered.
- 1946 April 19. Robert McAuliffe (17). Trinity Beach, near Cairns, Queensland. Died.
- 1946 Aug. 18. Man, P. S. Collin. Ellis Beach, 20 miles from Cairns, Queensland. Attacked 3 times. Died.
- 1946 Large sharks reported attacking fishing boats in Tasmania. One off Stanley and one in Storm Bay. *Fide* Capt. Leggett.
- 1946 Oct. 14. Boy, D. Blackmore (15). Lake Macquarie, N.S.W. Bitten twice on leg in muddy water. Recovered.
- 1946 Nov. 20. Native man, E. Johnson (30). Forty miles off Thursday Id., Queensland. Bit off right arm. Died.
- 1946 Dec. Leo Streng (23). Glenelg, S. Aus. Fingers and forearm bitten. Recovered.
- 1947 Aboriginal, Dan. Mornington Id., Queensland. Left leg bitten, in waist-deep water. Recovered.
- 1947 Nov. 8. Boy, Edwin James Elford (12). About 16 miles from mouth of Maria River, Port Macquarie, N.S.W. 4 p.m. Leg severed above knee. Died. *Sunday Sun* (Sydney), Nov. 11, 1947.
- 1947 Nov. 8. Brother of the last, Rupert Elford (13). Maria River, same place and time. This boy was attacked first, by his leg; as he was dragged from the water, his brother was attacked. *Truth* (Sydney), Nov. 9, 1947.
- 1947 c.Nov. Two surf-skis attacked off Newcastle, N.S.Wales.
- 1947 Nov. Daniel Smith, 78-year-old suicide. Moreton Bay, Queensland. Mutilated by sharks.
- 1947 Dec. 21. Boy, Don Ireland. Watson Taylor Lake, about 25 miles S. of Port Macquarie, N.S.W. Shark gashed his leg as he was hauling net in 18 inches of water, p.m. Recovered.
- 1948 Feb. 12. Ronald Johnson (16). Stockton, N.S.W. Died.
- 1948 Dec. 26. Man, E. Keyes (28). Coolangatta, Queensland. Died. *Sydney Morning Herald*, Dec. 27, 1948.
- 1949 Jan. 5. Hand found inside 8 ft. Tiger Shark. Off Leighton Beach, near Fremantle, W.A. *Daily Telegraph* (Sydney), Jan. 6, 1949.
- 1949 Jan. 13. Man tipped from surf-ski attacked by shark at Mona Vale, N.S.W. Escaped.
- 1949 Jan. 14. Man on surf-board chased by three sharks, off North Bondi, N.S.W., about 150 yards out. Rescued by men in motor boat. *Daily Mirror* (Sydney), N.S.W., Jan. 14, 1949.
- 1949 Jan. 23. Raymond Land (20). Newcastle, N.S.W.; about 120 yards out. Thigh gashed; attacked twice.

- 1949 April 17. R. J. Maguire (boy of 13). Cairns, Queensland. In 3 ft. of water, p.m. Left leg severed. Died. *Sydney Morning Herald* and *Daily Telegraph*, April 18, 1949.
- 1949 April or March. Shark: attacked boat, 18 miles south of Port Augusta, S. Australia.
- 1949 May 16. Miss K. Passaris. Broome, W.A. Left forearm severed. Recovered.
- 1949 Aug. 16. Bob Kay (18). Flinders Island, Bass Strait. Severe lacerations to hip. Recovered. *Daily Telegraph* (Sydney), Aug. 18, 1949.
- 1949 Aug. 28. James Howard (34). Yorkey's Knob beach, 15 miles from Cairns, Queensland. Deep gashes in right leg, badly "mauled" finger, and skin lacerated by fins and shagreen of shark. Died. *Daily Telegraph* (Sydney), Aug. 29, 1949.
- 1949 Nov. 12. John W. Smith's body, without head or hands, found in Port Phillip Bay, Victoria, after he had been missing since October 10. "Detectives say it seems clear that the man's head and hands were bitten off by sharks." *Sunday Herald* (Sydney), Nov 13, 1949.
- 1949 Nov. 20. Aboriginal man, W. E. Brown, bitten on left arm. Kurnell, Botany Bay, N.S.W. Recovered. "While Brown fought the shark in shallow water another shark circled around him . . . The other shark . . . did not try to attack Brown." *Sydney Morning Herald*, Nov. 21, 1949.
- 1950 March 9. Man's partly decomposed hand found in 4½ ft. Tiger Shark, off Safety Bay, W.A. Believed to have been that of Peter Szot (about 27) whose body was found at City Beach on March 1; his right hand was missing. *Sydney Morning Herald*, March 11, 1950.
- 1950 Nov. 25. Les Ryan (21) Burleigh Heads, Queensland. Badly bitten. Recovered. *Sunday Herald* (Sydney), Nov. 26, 1950.
- 1950 Dec. 16. Desmond Quinlan (19), Palm Beach, Queensland (5 miles north of where Les Ryan had been attacked 3 weeks before). Died. *Sunday Herald* (Sydney). Dec. 17, 1950.
- 1951 Jan. 3. Man's body apparently torn by shark found after about a week in water, Hawkesbury R., N.S.W. *Sun* (Sydney), Jan. 4, 1951.
- 1951 Feb. 1. Harry Sheen (14), Bondi, N.S.W. Leg bitten by 4ft. shark. Recovered. *Daily Mirror* (Sydney), Jan. 2, 1951.
- 1951 Feb. 3. Albert Pride (20), off Lake Illawarra. Was rushed by shark; suffered abrasions and shock. Recovered. *Sunday Sun* (Sydney), Feb. 4, 1951.
- 1951 March 26. Man bitten by Wobbecong which he had grabbed at Avalon, N.S.W. Injuries not serious. *Daily Telegraph* (Sydney), March 27, 1951.

ACKNOWLEDGMENTS

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